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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

Docket No. FAA-2018-0201; Special Conditions No. 25-717A-SC

Special Conditions: Bombardier Inc., Model BD-700-2A12 and BD-700-2A13 Series

Airplanes, Flight Envelope Protection: Pitch and Roll Limiting

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Amended final special conditions; request for comments.

SUMMARY: These amended special conditions are issued for the Bombardier Inc.

(Bombardier), Model BD-700-2A12 and BD-700-2A13 series airplanes. These amended special conditions change paragraphs 2 and 3 of the special conditions section based on information from Bombardier that makes changes to the novel or unusual design feature of this airplane. This airplane will have a novel or unusual design feature when compared to the state of technology envisioned in the applicable airworthiness standards for transport category airplanes. This design feature is the fly-by-wire electronic flight-control system (EFCS) that will limit pitch and roll functions to prevent the airplane from attaining certain pitch attitudes and roll angles. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: This action is effective on Bombardier Inc. on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Send comments on or before [INSERT DATE 45 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Send comments identified by docket number FAA-2018-0201 using any of the following methods:

☐ *uFederal eRegulations Portal:* Go to <http://www.regulations.gov/> and follow the online instructions for sending your comments electronically.

☐ *aMail:* Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE, Room W12-140, West Building Ground Floor, Washington, DC, 20590-0001.

☐ *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

☐ *oFax:* Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://www.regulations.gov/>, including any personal information the commenter provides. Using the search function of the docket Web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the *Federal Register* published on April 11, 2000 (65 FR 19477-19478).

Docket: Background documents or comments received may be read at <http://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Joe Jacobsen, FAA, Airplane and Flight Crew Interface Section, AIR-671, Transport Standards Branch, Policy and Innovation Division, Aircraft Certification Service, 2200 South 216th Street, Des Moines, Washington 98198; telephone 206-231-3158; email Joe.Jacobsen@faa.gov.

SUPPLEMENTARY INFORMATION: The FAA has determined that notice of, and opportunity for prior public comment on, these amended special conditions is impracticable because these procedures would significantly delay issuance of the design approval and thus delivery of the affected airplane. Additionally, the substance of these special conditions has been published in the *Federal Register* for public comment in several prior instances with no substantive comments received. Therefore, the FAA has determined that prior public notice and comment are impracticable and unnecessary, and finds that, for the same reasons, good cause exists for adopting these special conditions upon publication in the *Federal Register*.

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive by the closing date for comments. We may change these special conditions based on the comments we receive.

Background

On May 30, 2012, Bombardier applied for an amendment to Type Certificate No. T00003NY to include the new Models BD-700-2A12 and BD-700-2A13 series airplanes. The BD-700-2A12 and BD-700-2A13 series airplanes, are derivatives of the BD-700 currently approved under Type Certificate No. T00003NY, and are business jets with a maximum certified passenger capacity of 19. The maximum takeoff weight of Model BD-700-2A12 airplane is 106,250 lbs. and 104,800 lbs. for the Model BD-700-2A13 airplane.

Type Certification Basis

Under the provisions of title 14, Code of Federal Regulations (14 CFR) 21.101, Bombardier must show that the Model BD-700-2A12 and BD-700-2A13 series airplanes meet the applicable provisions of the regulations listed in Type Certificate No. T00003NY or the applicable regulations in effect on the date of application for the change except for earlier amendments as agreed upon by the FAA.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Model BD-700-2A12 and BD-700-2A13 series airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, or should any other model already included on the

same type certificate be modified to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Bombardier Model BD-700-2A12 and BD-700-2A13 series airplanes must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.101.

Novel or Unusual Design Features

The Model BD-700-2A12 and BD-700-2A13 series airplanes will incorporate the following novel or unusual design features:

Fly-by-wire EFCS that will limit pitch and roll functions to prevent the airplane from attaining certain pitch attitudes and roll angles greater than plus or minus 65 degrees, and introduce positive spiral stability introduced for roll angles greater than 30 degrees at speeds below V_{MO}/M_{MO} . This system generates the actual surface commands that provide for stability augmentation and flight control for all three airplane axes (longitudinal, lateral, and directional).

Discussion

Part 25 of title 14 of the CFR does not specifically relate to flight characteristics associated with fixed attitude limits. Bombardier proposes to implement on the airplanes pitch and roll attitude-limiting functions via the EFCS normal mode. This will prevent the airplane from attaining certain pitch attitudes and roll angles greater than plus or minus 65 degrees. In addition, positive spiral stability, introduced for roll angles greater than 30 degrees at speeds

below V_{MO}/M_{MO} , and spiral stability characteristics, must not require excessive pilot strength to achieve bank angles up to the bank-angle limit.

Bombardier requested this amendment, in order to be performance-based rather than prescriptive and to more closely follow the language developed in the Aviation Rulemaking Advisory Committee (ARAC) Flight Test Harmonization Working Group (FTHWG). The FAA concurs with this request.

The basic envelope protection requirement, historically applied, is to not unduly limit the maneuver capability of the airplane, or interfere with its ability to perform maneuvers required for normal and emergency operations. Since the design details used to meet this requirement vary from airplane to airplane, this amendment recognizes and adopts that philosophy for this specific design implementation. The substance of the special conditions is unchanged, in that, for this specific design, the design details support the objective of not unduly limiting the maneuver capability, while also protecting the airplane from adverse attitudes.

These special conditions are in addition to the requirements of § 25.143. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Applicability

As discussed above, these special conditions are applicable to the Model BD-700-2A12 and BD-700-2A13 series airplanes. Should Bombardier apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on one model series of airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

Authority Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Bombardier Model BD-700-2A12 and BD-700-2A13 series airplanes:

In addition to § 25.143, the following requirements apply to the electronic flight-control system (EFCS) pitch- and roll-limiting functions:

1. The pitch-limiting function must not impede normal maneuvering for pitch angles up to the maximum required for normal maneuvering, including a normal, all-engines-operating takeoff, plus a suitable margin to allow for satisfactory speed control.
2. The pitch- and roll-limiting functions must not restrict or prevent attaining pitch attitudes necessary for emergency maneuvering, or roll angles up to 65 degrees. Spiral stability, which is introduced above 30 degrees of roll angle, must not require excessive pilot strength to achieve these roll angles. Other protections, which further limit the roll

capability under certain extreme angle-of-attack, attitude, or high-speed conditions, are acceptable, as long as the airplane is able to perform coordinated turns as per § 25.143(h).

A roll attitude limit of approximately 45 degrees at high angle-of-attack conditions is acceptable.

3. A reduced roll attitude limit is acceptable at extreme nose down pitch attitudes and beyond the overspeed warning to provide protection against high-speed combined pitch and roll upsets. The airplane should be able to perform operational turns at these speeds.

A roll attitude limit of approximately 30 degrees at V_{df}/M_{df} is considered acceptable.

Issued in Des Moines, Washington.

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